Outline of mathematics

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The following outline is provided as an overview of and topical guide to mathematics:

Mathematics is a field of study that investigates topics such as number, space, structure, and change. For more on the relationship between mathematics and science, refer to the article on science.

Contents

Nature of mathematics

- Definitions of mathematics – Mathematics has no generally accepted definition. Different schools of thought, particularly in philosophy, have put forth radically different definitions, all of which are controversial.
- Philosophy of mathematics – its aim is to provide an account of the nature and methodology of mathematics and to understand the place of mathematics in people's lives.

Mathematics is

- an academic discipline – branch of knowledge that is taught at all levels of education and researched typically at the college or university level. Disciplines are defined (in part), and recognized by the academic journals in which research is published, and the learned societies and academic departments or faculties to which their practitioners belong.
- a formal science – branch of knowledge concerned with the properties of formal systems based on definitions and rules of inference. Unlike other sciences, the formal sciences are not concerned with the validity of theories based on observations in the physical world.

General reference

Classification systems

- Mathematics in the Dewey Decimal Classification system
- *Mathematics Subject Classification* – alphanumerical classification scheme collaboratively produced by staff of and based on the coverage of the two major mathematical reviewing databases, Mathematical Reviews and Zentralblatt MATH.

Reference databases

- *Mathematical Reviews* – journal and online database published by the American Mathematical Society (AMS) that contains brief synopses (and occasionally evaluations) of many articles in mathematics, statistics and theoretical computer science.
- *Zentralblatt MATH* – service providing reviews and abstracts for articles in pure and applied mathematics, published by Springer Science+Business Media. It is a major international reviewing service which covers the entire field of mathematics. It uses the Mathematics Subject Classification codes for organizing their reviews by topic.

Subjects

Quantity

Quantity –

- Arithmetic –
- Natural numbers –
- Integers –
- Rational numbers –
- Real numbers –
- Complex numbers –
- Hypercomplex numbers –
- Infinity –

Structure

Structure –

- Abstract algebra –
- Linear algebra –
- Number theory –
- Order theory –
- Function (mathematics) –

Space

Space –

- Geometry –
- Algebraic geometry –
- Trigonometry –
- Differential geometry –
- Topology –

- Fractal geometry –

Change

Change –

- Calculus –
- Vector calculus –
- Differential equations –
- Dynamical systems –
- Chaos theory –
- Analysis –

Foundations and philosophy

Foundations of mathematics –

- Philosophy of mathematics –
- Category theory –
- Set theory –
- Type theory –

Mathematical logic

Mathematical logic –

- Model theory –
- Proof theory –
- Recursion theory –
- Set theory –
- Type theory –

Discrete mathematics

Discrete mathematics –

- Combinatorics
- Theory of computation
- Cryptography
- Graph theory

Applied mathematics

Applied mathematics –

- Mathematical physics –
- Analytical mechanics –
- Mathematical fluid dynamics –
- Numerical analysis –
- Control theory –
- Dynamical systems –
- Mathematical optimization –
- Operations research –
- Probability –
- Statistics –
- Game theory –
- Mathematical economics –
- Financial mathematics –
- Information theory –
- Cryptography –
- Mathematical biology –

History

- Babylonian mathematics
- Egyptian mathematics
- Indian mathematics
- Greek mathematics
- Chinese mathematics
    - Abacus

- History of the Hindu–Arabic numeral system
- Islamic mathematics
- Japanese mathematics
- History of algebra
- History of geometry
- History of mathematical notation
- History of trigonometry
- History of writing numbers

Psychology

- Mathematics education
- Numeracy
- Numerical Cognition
- Subitizing
- Mathematical anxiety
- Dyscalculia
- Acalculia
- Ageometresia
- Number sense
- Numerosity adaptation effect
- Approximate number system
- Mathematical maturity

Influential mathematicians

See Lists of mathematicians

Mathematical notation

- List of mathematical abbreviations
- List of mathematical symbols
- List of mathematical symbols by subject

- Table of mathematical symbols by introduction date
- Notation in probability and statistics
- Table of logic symbols
- Physical constants
- Greek letters used in mathematics, science, and engineering
- Latin letters used in mathematics
- Mathematical alphanumeric symbols
- Mathematical operators and symbols in Unicode
- ISO 31-11 (Mathematical signs and symbols for use in physical sciences and technology)

See also

- Lists of mathematics topics
- Areas of mathematics
- Glossary of areas of mathematics

External links

- MAA Reviews – The Basic Library List – Mathematical Association of America (http://www.maa.org/press/maa-reviews/the-basic-library-list-maas-recommendations-for-undergraduate-libraries)
- Naoki's Recommended Books, compiled by Naoki Saito, U. C. Davis (http://www.math.ucdavis.edu/~saito/books.html)
- A List of Recommended Books in Topology, compiled by Allen Hatcher, Cornell U. (http://www.math.cornell.edu/~hatcher/Other/topologybooks.pdf)
- Books in algebraic geometry in nLab (http://ncatlab.org/nlab/show/books+in+algebraic+geometry)

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